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| 09/975,841 | 10/12/2001 | Rory Smith | 476-2059 | 3645 |
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| BARNES & THORNBURG P.O. BOX 2786 CHICAGO, IL 60690-2786 | | | HEINRICHS, CHRISTOPHER P | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2663 | |

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/975,841

Applicant(s)

SMITH ET AL

Examiner

Christopher P. Heinrichs

Art Unit

2663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/19/2002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

The specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 602.

2. The oath or declaration refers to an invention titled "SCALABLE SONET/SDH BANDWIDTH FOR STORAGE/DATA PROTOCOLS," whereas the specification title reads "BANDWIDTH ALLOCATION IN A SYNCHRONOUS TRANSMISSION NETWORK FOR PACKET ORIENTED SIGNALS."

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 7 recites the limitation "said Fibre Channel protocol" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 29 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claimed invention is a signal per se, which is not a process, machine, article of manufacture, composition of matter, or any new or useful improvement thereof. Rather a signal is a representation of data in the form of energy, conventionally electric or light energy and is therefore not patentable.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-6, 8-12, 14-29 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 6,636,529 to Goodman et al.

Art Unit: 2663

4. With regard to claims 1-3, 5, 8-12, 15-18, and 24-28, Goodman discloses an apparatus (fig 3) adapted to perform steps in a method of mapping a client signal (BACKPLANE I/F, fig 3) comprising a packet oriented client signal (Fibrechannel, ESCON, and ethernet, col 9 line 35) that uses a buffer-to-buffer flow control mechanism (ordered sets, col 8 line 23, as EOF and SOF ordered set shown in fig 7 in the service frame classified as Fibrechannel type, as opposed to a service frame classified as Ethernet type or a service frame classified as ESCON type, delimit the frame and identify it for buffer organization) to a synchronous transmission network payload (SDH container, col 10 line 37, also see col 9 lines 21-24) comprising a processor for processing said client signal (fig 3 item 330) to remove at least one ordered set provided according to a protocol of said client signal to form a second signal (col 10 lines 21-25, wherein replacing the ordered sets requires removal of original ordered sets, which are line encoding, and the addition of special headers causes the creation of a second signal, the above process illustrated in fig 7 in the removal and replacement of the Idles and the removal and replacement of the SOF and EOF), a buffer for storing the processed client signal in an ingress buffer (fig 4 item 510) and a mapper (fig 3 item 300) for mapping the processed client signal to said synchronous payload (SDH container, col 10 lines 34-39), wherein said apparatus preserves the buffer-to-buffer flow control mechanism of the client signal (by stretching and shrinking the interpacket gaps, col 8 lines 43-46) and maintains the integrity of the payload of the client signal (by preventing buffer under/overflow the integrity is maintained as set forth in col 8 lines 43-46). The bandwidth is reduced during the removal of the Idles noted above, as they are

Art Unit: 2663

inherent to the group of Fibrechannel ordered sets, and Fibrechannel ordered sets use the 10-bit format (col 8 lines 22-24) which cannot be mapped directly into SDH (synchronous network on which payload is transported) octets which are inherently 8 bits. The Fibrechannel Idle ordered sets are removed and replaced with the Special Headers (fig 7) which can map onto SDH and are 8 bits. The reduction of data to transport is by 2 bits, from 10 to 8, thereby reducing bandwidth necessary to transport the same information by two bits per Idle. Fig 7 shows, in the incoming Fibrechannel frame, two Idles at the end, the second being redundant, which is replaced by a special header. The processed signal is padded (stretching the interpacket gap in the col 8 lines 43-36 reference) so that it appropriately fills a predetermined synchronous payload bandwidth (as especially unpredictable expansion of the interpacket gap should be avoided because extra SDH bandwidth would be needed to cater for it, col 8 lines 54-57, the extra SDH bandwidth would be above a bandwidth determined prior to the recognition that the extra bandwidth would in fact be extra). Fig 3 depicts the apparatus that implements the method of mapping (as noted above) and manages access to the BACKPLANE network (network management system), and allocates the bandwidth of the synchronous payload by mapping the virtual concatenations (fig items 320) via SDH framing. As stated in col 9 lines 1-5, a plurality of client signals (separate data paths) that are mapped into the virtual concatenations (fig 3 items 320) are multiplexed by the mux/demux of fig 3 item 310 to share the SDH frame. Fig 3 shows that the apparatus is an element on the BACKPLANE network, and it supports transmission of the client signal by mapping it to the synchronous network payload, as stated above. The

Art Unit: 2663

apparatus supports the synchronous network payload operation by providing it the mapped client signal in a framed fashion as stated above and completed by fig 3 item 300. The apparatus disclosed by Goodman which anticipates claims 24-28 performs all method steps of claims 1-3, 5, 8, 10-12, 15-18.

5. With regard to claims 4, 19, and 23, Goodman discloses all aspects of the methods of claims 1, 16, and 20, respectively. Goodman further discloses in col 11 lines 53-57, that the Fibrechannel signal will have at a minimum between packets 6 "primitives," and it is an inherent property of the Fibre Channel protocol that a "primitive sequence" comprises at least 3 "primitives," hence the 6 primitives constitute 2 primitive sequences, hence a plurality of primitive sequences. The above noted reference describes where the 6 primitives are reduced to 2 primitives, removing data between packets and thereby reducing bandwidth, and since 4, which is at least 3, primitives are removed then a primitive sequence has been removed. The six interpacket primitives, which are inherently ordered sets, all identify a separation of packets, hence at least one sequence of the above noted sequences is redundant and allowed to be removed as set forth in the cited reference.

6. With regard to claim 6, Goodman discloses all aspects of the invention of claim 1 and further discloses yet another buffer-to-buffer flow control mechanism (spoofing, col 8 lines 17-25) provided according to an ESCON protocol class of service (as opposed to service classified as Fibre Channel or service classified as Ethernet).

7. With regard to claim 14, Goodman discloses all aspects of the invention of claim 1 and further discloses that the synchronous payload bandwidth (data rate) is modified (significantly reduced) in response to changes in data throughput (delays caused by handshaking) as distance between the end data packet nodes changes (reduced for communications greater than 10 km) (col 8 lines 26-32).

8. With regard to claims 20-22, Goodman discloses a method of restoring a packet oriented client signal from at least one synchronous network payload, the method comprising the steps of receiving said synchronous payload (SDH container, col 10 line 52, via receiving interface fig 5 and col 10 line 42), de-mapping said signal from said synchronous payload (using the device of fig 5 resulting in the "END USER DATA"), storing said signal in an egress buffer (small FIFO, fig 5 item 560), and processing said signal to add at least one ordered set provided according to a protocol of said packet orientated client signal (col 10 lines 56-61), wherein said method of restoring the client signal maintains the integrity of the payload of said packet oriented client signal (col 10 lines 62-65, via indication of code violations) and preserves a buffer-to-buffer flow control mechanism of said client signal (spoofing, col 10 line 66 – col 11 line 2). Goodman further discloses that said step of de-mapping includes removing at least one padding character added to said signal prior to being mapped to said synchronous payload (any headers added purely for stuffing, col 10 lines 45-46), and that at least one

Art Unit: 2663

ordered set is a client signal idle inserted between client signal packets in said signal according to the client protocol (col 11 liens 64-67).

9. With regard to claim 29, the output of the SDH framing unit will be a signal that comprises an SDH container wherein the payload of said one or more synchronous containers comprises a client signal adapted to a reduced bandwidth format, wherein the integrity of the payload of said client signal is preserved in said synchronous payload, and wherein a buffer to buffer flow control mechanism of said client signal is preserved in said synchronous payload, all as set forth in the rejection of claim 1.

10. With regard to claim 36, Goodman discloses a method for allocating bandwidth performed by SDH FRAMING unit 300 of fig 3, wherein the framing unit frames the multiplexed (item 310) outputs of items 320 and the frame is transmitted over the synchronous network in a synchronous digital network (col 8 lines 65-67 and fig 3 BACKPLANE I/F) necessitating that at least some bandwidth is allocated for the frame, for a packet oriented signal having buffer to buffer flow control the method comprising the steps of received said packet oriented signal, processing said packet oriented signal to a processed signal having a form suitable for mapping to a synchronous network payload, wherein the processing preserves a buffer-to-buffer flow control mechanism of said packet oriented signal, wherein said step of processing removes redundant information from the packet oriented signal while maintaining the integrity of a payload of the packet oriented signal, and mapping said processed signal to a said synchronous

Art Unit: 2663

network payload (all as set forth in the rejections of claims 1 and 2) having a bandwidth determined according to the bandwidth of said processed signal (one of separate data paths, which are placed in the virtual containers and accordingly treated as in col 9 lines 3-10).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,636,529 to Goodman et al in view of US-PGPUB 2003/0152182 submitted by Pai et al.

14. With regard to claim 7, Goodman discloses all aspects of the invention of claim 1 and further discloses that the buffer-to-buffer flow control mechanism is provided according to a Fibre Channel protocol class of service as set forth in the rejection of claim 5. Goodman fails to disclose that said packet oriented client signal is provided according to a higher level protocol supported by the Fibre Channel protocol. However, Pai discloses a system and method for transporting Fibre Channel data over a synchronous network (SONET) mapped into a payload (SPE, see abstract), the mapped signal being the packet-oriented IP protocol, which is supported by Fibre Channel. It would have been obvious to one ordinarily skilled in the art at the time of the invention to include the higher level protocol packet oriented client signal disclosed by Pai with the method disclosed by Goodman to arrive at the invention of claim 7. The motivation to do so would have been to adapt the invention disclosed by Goodman to the most common existing protocol, IP protocol, used today (Pai, paragraph 18), and Pai suggests in paragraph 18 that the IP protocol can ride on top of any protocol and physical media.

15. Claims 13 and 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,636,529 to Goodman et al in view of US Patent 6,842,455 to Heuer.

16. With regard to claim 13, Goodman discloses all aspects of the method of claim 1 but fails to explicitly disclose that the synchronous payload bandwidth is modified in response to customer bandwidth demands increasing/decreasing. However, Heuer

Art Unit: 2663

discloses this element (the use of different numbers of virtual containers, fig 1 and fig 2, described in col 3 lines 38-61). It would have been obvious to one ordinarily skilled in the art at the time of the invention to include the method of load balancing disclosed by Heuer with the method disclosed by Goodman to arrive at the method of claim 30. The motivation to do so would have been that Goodman explicitly states that the packet oriented signal is virtually concatenated (col 9 lines 3-17) and that the generation of the synchronous network payload is "standard practice...and equipment specific" (col 10 lines 37-39) and the scope of the invention disclosed by Goodman does not include details of the synchronous network bandwidth modification. Heuer discloses equipment that provides the specifics of the method of synchronous network bandwidth modification as set forth above

17. With regard to claim 30, Goodman discloses a method comprising a packet orientated client signal across a synchronous network, wherein the traffic comprises at least one synchronous network payload comprising a packet oriented client signal which is controlled by a buffer-to-buffer flow control mechanism, the signal having been mapped to a synchronous network payload, using a method including the steps of receiving said client signal, processing said client signal to a form suitable for mapping to said payload which preserves a buffer-to-buffer flow control mechanism of the client signal, wherein said step of processing reduces the bandwidth of the client signal while maintaining the integrity of a payload of the client signal, and mapping said processed signal to said synchronous network payload (all as set forth in the rejection of claim 1),

Art Unit: 2663

but fails to explicitly disclose the subsequent elements of claim 30. However, Heuer discloses a method of load balancing that comprises the steps of pre-allocating an initial bandwidth of said synchronous network payload (use of VC-4-4v in fig 1, in a virtual concatenation as disclosed in column 3 lines 15-17) according to a predetermined condition (periods of high traffic, col 3 lines 38-42), wherein said payload comprises a plurality of virtually concatenated virtual containers (fig 1 items 13a-13d), diversely routing said synchronous network payload over said synchronous network (col 3 lines 20-24), and in the event of a change in a condition of the network (periods where number of IP packets does not suffice... col 3 lines 43-58), modifying the allocated bandwidth (fig 2 uses only 3 virtual containers 13a-13c). It would have been obvious to one ordinarily skilled in the art at the time of the invention to include the method of load balancing disclosed by Heuer with the method disclosed by Goodman to arrive at the method of claim 30. The motivation to do so would have been that Goodman explicitly states that the packet oriented signal is virtually concatenated (col 9 lines 3-17) and that the generation of the synchronous network payload is "standard practice...and equipment specific" (col 10 lines 37-39) and the scope of the invention disclosed by Goodman does not include details of synchronous network load balancing. Heuer discloses equipment that provides the specifics of the method of synchronous network load balancing as set forth above.

18. With regard to claims 31-32 and 34, Goodman and Heuer disclose all aspects of the method of claim 30, and Heuer further discloses that the bandwidth is automatically

Art Unit: 2663

modified by the apparatus performing the mapping, as disclosed in col 4 lines 34-45, wherein at the time thresholds the bandwidth is changed automatically to a pre-allocated value.

19. With regard to claim 33, Goodman and Heuer disclose all aspects of the method of claim 30, and Heuer further discloses that the pre-allocation bandwidth is determined by requirements requested by a user of the network, as high traffic loads as set forth in the rejection of claim 30 represent a user or users requiring to transfer much traffic.

20. With regard to claim 35, Goodman and Heuer disclose all aspects of the method of claim 30, and Heuer further discloses that the pre-allocation is determined by the condition of the synchronous network, as all 4 virtual containers of fig 1 are used due to the high traffic period condition of the data network as set forth in the rejection of claim 30.

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Pelley et al. (US-PGPUB 2002/0122433), Data Mapper and Method for Flexible Mapping of Control and Data Information Within A SONET Payload.

Art Unit: 2663


- b. Boggs et al. (US 5,959,994), ATM/SONET Network Enhances as a Universal Computer System Interconnect.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P. Heinrichs whose telephone number is 571-272-8397. The examiner can normally be reached on Monday through Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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6/9/05